

REMARKS

This Amendment is being entered in response to the Office Action of September 10, 2004. In this Office Action, the Examiner made the following objections and rejections:

- 5 1. The Examiner has acknowledged allowable subject matter
 2. The Examiner has rejected claims 1-5 as allegedly being anticipated by Yano.

 3. The Examiner has rejected claims 6-17 as allegedly being obvious in view of Yano in further view of Tsukimoto.

- 10 Applicants have amended the claims to more clearly distinguished between the present invention and the prior art of record. In addition, arguments have been provided which will help distinguish the claims from the prior art. New claim language has also been suggested. Reconsideration is respectfully requested.

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1. The Examiner has acknowledged allowable subject matter

The Examiner has acknowledged the existence of allowable subject matter, stating:

- 20 Claims 18-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

- 25 The applicant would like to thank the Examiner for this allowance. In compliance with the Examiner's suggestion, claim 18 has been rewritten in independent format. Claims 19 and 20 depend therefrom. It is respectfully submitted that all objections to claims 18-20 have been obviated.

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2. The Examiner has rejected claims 1-5 as allegedly being anticipated by Yano

The Examiner has rejected claims 1-5 as allegedly being anticipated by United States patent 6,366,004 to Yano, stating:

5 Claims 1-5 are rejected under 35 U.S.C. 102(b) as
 anticipated by Yasuo(63092278). Tsukimoto
 discloses an ultrasonic motor in Fig. 1-8 comprising:
 threaded shaft (17) with an axis of rotation and
 engaged therewith, a thread nut (45) wherein; the
10 assembly comprise a means for subjecting the thread
 nut to ultrasonic vibrations (5,6) and thereby causing
 the threaded shaft (17) to simultaneously rotate and
 translate in the axial direction. Wherein, the shaft is
 operatively connected to a load (voltage) and the
15 assembly comprises a means for applying an axial
 force (44) to the threaded shaft, and a means for
 moving the threaded nut in an orbital direction (5, 6).
 Yasuo also disclose, the thread nut having
 substantially a rigid body and a housing (12) in which
20 the threaded shaft is disposed. Wherein, the nut is
 attached to the housing and the shaft has a
 multiplicity of threads with a thread pitch for about 40
 threads per inch.

 A phone call by applicant's agent was made on October 15, 2004, wherein
25 the Examiner clarified that the above references to "Yasuo(63092278),",
 "Tsukimoto," and "Yasuo" properly refer to United States patent 6,366,004 to
 Yano. The numeric elements referenced by the Examiner appear to correspond
 to the references contained within the Yano patent. Kindly consider this
 paragraph a reduction to writing of this telephone interview.

The applicant respectfully disagrees that claims 1-5 are anticipated by the Yano reference. Nevertheless, the applicant has amended independent claim 1 so as to clearly distinguish from the reference cited.

5 With regard to claim 1, the applicant notes that Yano teaches screw portion 17 which is affixed to nut 45 in such a way as to prevent axial translation. See for example, column 3, beginning at line 51 of the Yano reference which states:

10 In this manner, the first and second piezoelectric elements 5, 6 and the first and second electrode plates 7, 8 are held between the first and second blocks 3, 4, which prevents the elements 5, 6 and the plates 7, 8 from moving axially.

The principal of operation of the Yano device is summarized at column 5, beginning at line 15, where it is stated:

15 When a predetermined high frequency current is applied to the piezoelectric elements 5, 6 via the electrode plates 7, 8, the elements 5, 6 vibrate axially. The axial vibration on the upper surface of the stator 1 (the upper surface 23a of the lining member 23). The
20 axial vibration on the upper surface of the stator 1 is imparted to each projection 31. Accordingly, each projection 31 vibrates torsionally. The torsional vibration of each projection 31 rotates the rotor 2 counterclockwise as viewed in FIG. 6.

25 This is contrary to the principal of operation of the present invention. Claim 1 clearly requires axial translation. Is it clear from the teaching of Yano that the screw portion 17 is not translating axially. The only reference to axial movement is in regard to the piezoelectric elements which merely vibrate axially. Such vibratory motion is clearly not translation in the axial direction. And even if,
30 for the sake of argument, such vibratory motion was to be considered translation in the axial direction (which is clearly is not), the element that is vibrating is a

piezoelectric element, and not a threaded screw, as required by claim 1 of the present application.

To more clearly describe the present invention, the applicant has amended claim 1 to recite the limitation that the aforementioned translation
5 occurs such that the threaded shaft translates through the nut. Even if, for the sake of argument, the Examiner did not find the above argument persuasive, this amendment clearly distinguishes the present claim from the device of Yano.

Should the Examiner traverse upon the grounds that it would be obvious to modify the teaching of Yano to cause the screw portion 17 to translate axially
10 through the nut, the applicant would note for the record that there is no suggestion or motivation in the prior art of record that reasonably suggests such a modification. Indeed, the Yano reference itself teaches away from such a modification, as such a modification would render the device of Yano unsuitable for its intended purpose. The purpose of screw portion 17 and nut 45 is to hold
15 Yano's device together. This is accomplished by mounting the nut a fixed distance onto the screw. See, for example, column 5, line 5, which states "The nut 45 is threaded to the distal end of the screw portion 17 by a predetermined amount." Should screw portion 17 accidentally translate in the axial direction through nut 45, the device would quickly unscrew and there would no longer be
20 any force holding Yano's device together. As such, Yano's device would fall apart and be rendered unsuitable for its intended purpose.

Even if, for the sake of argument, the Examiner did not find the above argument persuasive, claim 1 is still patentably distinct from the prior art of record for additional reasons, several of which will be discussed below.

25 In further regard to claim 1, the Examiner has suggested that Yano teaches that "said threaded shaft is operatively connected to a load" and interprets a "voltage" as a load. Applicants have amended claim 1 to recite "said threaded shaft is operatively connected to a load in said axial direction." Clearly a "voltage" is not a load in the axial direction. This limitation clearly distinguishes
30 from the Yano reference, as Yano generates torsional forces, not axial forces.

In further regard to claim 1, the Examiner has suggested that Yano teaches an "assembly comprises a means for applying an axial force to said threaded shaft" and references element 44 of the Yano patent. The applicant respectfully disagrees that element 44 delivers an axial force to screw portion 17.

5 Element 44 is a ball bearing that allows rotation of screw portion 17 in a rotary fashion, and actually prevents axial forces. See, for example, column 5, line 13, "The ball bearing 44 permits the rotor 2 to rotate relative to the bolt 14." The applicant respectfully submit that ball bearing 44 is not applying an axial force to the screw portion 17.

10 It is respectfully submitted that the rejections of claim 1 have been obviated for the reasons outlined above. As claims 2-20 all depend, either directly or indirectly, upon claim 1, claims 2-20 should likewise be allowed.

With regard to claim 2, the claim recites "The apparatus as recited in claim 1, wherein said assembly comprises means for moving said threaded nut in an orbital direction." The Examiner has suggested that Yano teaches "a means for moving the threaded nut in an orbital direction (5, 6)" Elements 5 and 6 are piezoelectric elements. As discussed in column 5, beginning at line 15 of the Yano reference, these piezoelectric elements cause bolt 14 to vibrate, which, in turn, causes rotor 2 to move in an orbital direction. It is the rotor 2 that moves in an orbital direction, and not the nut 45. Claim 1 clearly states "means for moving said threaded nut in an orbital direction." As previously discussed, should nut 45 of the Yano invention move in an orbital direction, it would quickly become detached from screw portion 17. Once this detachment occurs, the device of Yano would fall apart and be rendered unsuitable for its intended purpose.

25 In further regard to claim 2, claim 2 recites that the nut (which is moving in an orbital direction) is engaged with a threaded shaft. In the Yano reference, the rotor 2 (which is moving in an orbital direction) does not engaged the screw portion 17. Clearly the Yano reference does not meet the criteria recited in claim 2. As such, claim 2 cannot be anticipated by the Yano reference.

30 With regard to claims 2-5, applicant notes that these claims are dependent on independent claim 1. For the reasons discussed above, claim 1 is allowable.

As claims 2-5 contain all of the limitations found in allowable claim 1, claims 2-5 are also allowable. Applicant respectfully requests reconsideration.

**3. The Examiner has rejected claims 6-17 as allegedly being obvious in
5 view of Yano in further view of Tsukimoto**

The Examiner has rejected claims 6-17 as allegedly being obvious in view of United States patent 6,366,004 to Yano, in further view of United States patent 5,387,835 to Tsukimoto.

10 Claim 6-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yano in view of Tsukimoto (5387835). Yano substantially discloses the claim invention. However, Yano do not disclose a housing having a first and second bending resonant frequency. Tsukimoto disclose a ultrasonic motor in
15 Figures 1-9 comprising: a housing (1a, 1b, 2, 6) having a shaft (3), and a nut (3) wherein the housing have a first and second bending resonant frequency for the purpose of increasing the amplitude of a portion of the vibration member contact portion.
20 Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the ultrasonic motor of Yano with ultrasonic motor of Tsukimoto for the purpose of increasing the rotational speed of the motor.
25 Regarding claim 15-16 it would have been obvious to one having ordinary skill in the art at the time the invention was made to select a piezoelectric material that has a dielectric loss of 1 percent frequency greater than about 20,000, since it has been held to
30 be within the general skill of a worker in the art to select a known material on the basis of its suitability

for the intended use as a matter of obvious design
choice. In re Leshin, 125 USPQ, 416.

With regard to claims 6-17, the Examiner has asserted that "Yano
substantially discloses the claim invention." As discussed above, applicant
5 respectfully disagrees. As the Yano reference clearly fails to disclose the
claimed invention, any obviousness rejection based upon this incorrect assertion
must fail. Applicant notes that claims 6-17 are dependent on independent claim
1. For the reasons discussed above, claim 1 is allowable. As claims 6-17
contain all of the limitations found in allowable claim 1, claims 6-17 are also
10 allowable.

With regard to the Tsukimoto reference in general, applicant would like to
note for the record that many of the criticisms of the Yano reference are equally
applicable to the Tsukimoto reference. For example, the Tsukimoto reference
fails to teach or suggestion the translation of a threaded screw through a nut in
15 the axial direction. Indeed, should such a translation occur, the Tsukimoto
device would disassemble and be rendered unsuitable for its intended purpose.
It is therefore clear that the Tsukimoto reference actually teaches away from any
modifications which would render it similar to the claimed invention. Applicant
respectfully submits that the obviousness rejections of claims 6-17 are untenable.

CONCLUSION

In an attempt to facilitate the prosecution of this application, the applicant
has supplied the Examiner with alternative claim language in the form of claims
21-23. It is the earnest hope of the applicant that this language will assist the
25 Examiner to clearly distinguish between the prior art of record and the present
claims.

Claims 21 and 22 are drawn to bidirectional movement of the threaded
shaft. Such movement is discussed in the specification. Reference may be had
to page 7, beginning at line 8, "Phase shift between the drive signals may be
30 positive or negative, which reverses the direction of the nut orbit and the shaft

rotation/translation." The prior art of record is incapable of bidirectional movement.

Claim 23 is drawn to the degree of rotation of the threaded shaft through the nut. The prior art of record fails to disclose the rotation of the threaded shaft through a nut. As such, it clearly cannot suggest or teach the rotation of the threaded shaft through the nut by at least a 360 degree rotation, as required in claim 23.

Claim 24 is drawn to clearly differentiating between mere vibratory oscillation and actual translation. The prior art of record clearly does not translate the threaded shaft through the nut. As such, the prior art cannot teach the translation of the nut by the degree specified in claim 24.

Applicants respectfully request reconsideration and that a timely Notice of Allowance be issued in this case. If, for any reason, the Patent Examiner believes that a telephone conference with applicants' agent might in any way facilitate the prosecution of this case, the Examiner is respectfully requested to call such agent.

To the extend necessary, please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 50-2753 and credit any excess fees to such deposit account. If necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made.

Respectfully submitted,
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